# Virology

QR
360
V5

VOLUME 21 • 1963

EDITORS

*George K. Hirst*, EDITOR-IN-CHIEF *L. M. Black* *Myron K. Brakke*
*S. E. Luria* *L. Siminovitch* *Irwin Tessman*

ASSOCIATE EDITORS

*G. Bertani*
*Rupert J. Best*
*Allan Campbell*
*John S. Colter*
*Samuel Dales*
*Frank Fenner*
*Clarence R. Fuerst*
*Robert W. Fulton*
*Karl Habel*
*Werner Henle*
*A. D. Hershey*
*Robert Horne*
*W. K. Joklik*
*Basil Kassanis*
*Eduard Kellenberger*
*C. A. Knight*
*David R. Krieg*
*Leon Levintow*
*André Lwoff*
*Benjamin Mandel*
*Roy Markham*
*A. F. Ross*
*Harry Rubin*
*W. Schäfer*
*R. Walter Schlesinger*
*Albert Siegel*
*Robert L. Sinsheimer*
*Michael Stoker*
*J. P. H. van der Want*
*H. G. Wittmann*
*C. E. Yarwood*

ACADEMIC PRESS
*New York and London*

Copyright ©, 1963, by Academic Press Inc.

ALL RIGHTS RESERVED

No part of this volume may be reproduced in any form, by photostat, microfilm, or any other means, without written permission from the publishers.

Made in the United States of America

## Contents of Volume 21

Number 1, September 1963

A. F. Howatson and L. V. Crawford. Direct Counting of the Capsomeres in Polyoma and Papilloma Viruses ..... 1
Garret Ihler and Matthew Meselson. Genetic Recombination in Bacteriophage λ by Breakage and Joining of DNA Molecules ..... 7
Kari Cantell and Kurt Paucker. Quantitative Studies on Viral Interference in Suspended L Cells. IV. Production and Assay of Interferon ..... 11
Kurt Paucker and Kari Cantell. Quantitative Studies on Viral Interference in Suspended L Cells. V. Persistence of Protection in Growing Cultures ..... 22
Werner Arber, Stanley Hattman, and Daisy Dussoix. On the Host-Controlled Modification of Bacteriophage λ ..... 30
R. G. Grogan, J. K. Uyemoto, and K. A. Kimble. Evidence that Tomato Aspermy and Cucumber Mosaic Viruses are Serologically Unrelated ..... 36
A. H. P. Engelbrecht and K. Esau. Occurrence of Inclusions of Beet Yellows Viruses in Chloroplasts ..... 43
Hilton B. Levy, Leroy F. Snellbaker, and Samuel Baron. Studies on the Mechanism of Action of Interferon ..... 48
E. A. Mirand, J. T. Grace, Jr., and J. G. Hoffman. Inhibition of Mouse Tumor Transplants by Polyoma Virus Inoculation ..... 56
K. J. Lafferty. The Interaction between Virus and Antibody. I. Kinetic Studies ..... 61
K. J. Lafferty. The Interaction between Virus and Antibody. II. Mechanism of the Reaction ..... 76
K. J. Lafferty and S. Oertelis. The Interaction between Virus and Antibody. III. Examination of Virus-Antibody Complexes with the Electron Microscope ..... 91
D. H. Watson and P. Wildy. Some Serological Properties of Herpes Virus Particles Studied with the Electron Microscope ..... 100
I. H. Holmes and D. H. Watson. An Electron Microscope Study of the Attachment and Penetration of Herpes Virus in BHK21 Cells ..... 112

DISCUSSION AND PRELIMINARY REPORTS

F. L. Schaffer and A. J. Hackett. Early Events in Poliovirus-HeLa Cell Interaction: Acridine Orange Photosensitization and Detergent Extraction ..... 124
František Sokol. Heterogeneity of Newcastle Disease Virus (NDV) Particles with Respect to Their Hemolytic Activity ..... 126
M. V. Fernandes, T. J. Wiktor, and H. Koprowski. Mechanism of the Cytopathic Effect of Rabies Virus in Tissue Culture ..... 128
Albo Saturno. The Morphology of Mayaro Virus ..... 131
Erratum ..... 134

Number 2, October 1963

John N. Wilson and Peter D. Cooper. Aspects of the Growth of Poliovirus as Revealed by the Photodynamic Effects of Neutral Red and Acridine Orange ..... 135
Peter F. Davison. The Structure of Bacteriophage SP8 ..... 146
R. H. E. Bradley. Are Aphids Apt to Acquire Potato Virus Y, or Transmit It, When Probing Plants through a Membrane? ..... 152

Paul R. Whitfeld and Shirley Williams. On the Ribonuclease Activity Associated with Tobacco Mosaic Virus Preparations ..... 156
Claudia Henry and Julius S. Youngner. Studies on the Structure and Replication of the Nucleic Acid of Poliovirus ..... 162
Sven-Eric Svehag. Reactivation of Neutralized Virus by Fluorocarbon: Mechanism of Action and Demonstration of Reduced Reactivability with Time of Virus-Antibody Interaction ..... 174
R. C. Sinha and L. M. Black. Wound-Tumor Virus Antigens in the Internal Organs of an Insect Vector ..... 183
R. F. Bozarth and T. O. Diener. Changes in Concentration of Free Amino Acids and Amides Induced in Tobacco Plants by Potato Virus X and Potato Virus Y .. 188
James E. Duffus. Possible Multiplication in the Aphid Vector of Sowthistle Yellow Vein Virus, a Virus with an Extremely Long Insect Latent Period ..... 194
Thelma H. Dunnebacke. Electron Microscope Observations of Liver Cells Inoculated with Lipovirus ..... 203
F. Solymosy and G. L. Farkas. Metabolic Characteristics at the Enzymatic Level of Tobacco Tissues Exhibiting Localized Acquired Resistance to Viral Infection .. 210
Y. Kanda Inoue and Hinae Kato. Studies on Japanese B Encephalitis Virus. V. A Thermoefficient Mutant of Japanese B Encephalitis Virus ..... 222
Yukimasa Hayashi. Incorporation of $C^{14}$-Amino Acids in Various Cell Fractions of Tobacco Leaves Infected with Tobacco Mosaic Virus ..... 226
Frances C. Womack. An Analysis of Single-Burst Progeny of Bacteria Singly Infected with a Bacteriophage Heterozygote ..... 232
H. Uetake, S. Hagiwara, and S. Toyama. Dependence of Lysogenization on Phage-Propagating Bacteria ..... 242
Fred Goodman. Nucleic Acid Metabolism and Bacteriophage Multiplication: Effects of 5-Fluorouracil on Coliphage Synthesis ..... 249
L. V. Crawford and E. M. Crawford. A Comparative Study of Polyoma and Papilloma Viruses ..... 258

DISCUSSION AND PRELIMINARY REPORTS

Minoru Nakano, Shizue Iwami, and Isamu Tagaya. A Guanidine-Dependent Variant of Poliovirus. Isolation of a Variant and Some of Its Biological Properties ..... 264
Dietrich Peters and Günther Müller. The Fine Structure of the DNA-Containing Core of Vaccinia Virus ..... 266
Howard A. Bladen, Jr. and Abner Louis Notkins. Electron Microscopic Demonstration of the Lactic Dehydrogenase Agent ..... 269
Eugene V. Adams and Vincent Groupé. A Macrofocus Assay for Rous Sarcoma Virus (RSV) in Chicken Embryo Cells ..... 271
E. R. Pfefferkorn and Ruth L. Clifford. Precipitation and Recovery of Sindbis Virus from Solutions of Low Ionic Strength ..... 273
Yechiel Becker, Sheldon Penman, and J. E. Darnell. A Cytoplasmic Particulate Involved in Poliovirus Synthesis ..... 274
Frances Messik Schwartz and Norton D. Zinder. Crystalline Aggregates in Bacterial Cells Infected with the RNA Bacteriophage f2 ..... 276
Purnell W. Choppin. On the Emergence of Influenza Virus Filaments from Host Cells ..... 278
H. J. Eggers, D. Baltimore, and I. Tamm. The Relation of Protein Synthesis to Formation of Poliovirus RNA Polymerase ..... 281

G. E. Russell and John Bell. The Structure of Beet Yellows Virus Filaments . . . 283
P. Siminoff and F. C. Reed, III. A Macroscopic Method for Counting Foci Produced by Rous Sarcoma Virus *in Vitro* . . . 284
Takashi Kitamura. Reactivation of Protease-Inactivated Vaccinia Virus . . . 286

Number 3, November 1963

Gert B. Orlob. Some Effects of Photosensitizing Dyes on Three Plant Viruses . . . 291
R. A. Solberg and J. G. Bald. Distribution of a Natural and an Alien Form of Tobacco Mosaic Virus in the Shoot Apex of *Nicotiana glauca* Grah. . . . 300
John Seamer, James L. Barlow, A. W. Gledhill, and John Hotchin. Increased Susceptibility of Mice to Lymphocytic Choriomeningitis Virus after Peripheral Inoculation . . . 309
Ken Wolf, M. C. Quimby, and Arthur D. Bradford. Egg-Associated Transmission of IPN Virus of Trouts . . . 317
Peter D. Cooper. The effect of Concentrated Urea Solutions on Poliovirus Strains Adapted to Different Growth Temperatures . . . 322
Craig Wallis and Joseph L. Melnick. Photodynamic Inactivation of Poliovirus . . . 332
Purnell W. Choppin. Multiplication of Two Kinds of Influenza A2 Virus Particles in Monkey Kidney Cells . . . 342
W. C. Russell and L. V. Crawford. Some Characteristics of the Deoxyribonucleic Acid from Herpes Simplex Virus . . . 353
Arthur Brown. Differences in Maximum and Minimum Plaque-Forming Temperatures among Selected Group A Arborviruses . . . 362
Richard I. Carp. A Study of the Mutation Rates of Several Poliovirus Strains to the Reproductive Capacity Temperature/40+ and Guanidine Marker Characteristics . . . 373
B. R. McAuslan. The Induction and Repression of Thymidine Kinase in the Poxvirus-Infected HeLa Cell . . . 383
L. Bailey, A. J. Gibbs, and R. D. Woods. Two Viruses from Adult Honey Bees (*Apis mellifera* Linnaeus) . . . 390
F. Piraino, W. Okazaki, B. R. Burmester, and T. N. Fredrickson. Bioassay of Fowl Leukosis Virus in Chickens by the Inoculation of 11-Day-Old Embryos . . . 396
A. Steinberger and F. L. Rights. Effect of Immunization on Tissue Susceptibility to Vaccinia Virus *in Vitro* . . . 402
J. D. Friesen, D. Sankoff, and L. Siminovitch. Radiobiological Studies of Vaccinia Virus . . . 411
C. J. Pfau and J. F. McCrea. Studies on the Deoxyribonucleic Acid of Vaccinia Virus. III. Characterization of DNA Isolated by Different Methods and Its Relation to Virus Structure . . . 425
Ann E. Farnum and Wolfgang Epstein. The Influence of Encephalomyocarditis (EMC) Virus Infection on Potassium Transport in L Cells . . . 436
C. P. Stanners, J. E. Till, and L. Siminovitch. Studies on the Transformation of Hamster Embryo Cells in Culture by Polyoma Virus. I. P. Properties of Transformed and Normal Cells . . . 448
C. P. Stanners. Studies on the Transformation of Hamster Embryo Cells in Culture by Polyoma Virus. II. Selective Techniques for the Detection of Transformed Cells . . . 464
J. Koza. Calcium Phosphate Adsorption Patterns of Virulent and Avirulent Strains of Poliovirus . . . 477

Bernard Roizman, Laure Aurelian, and Philip R. Roane, Jr. The Multiplication of Herpes Simplex Virus. I. The Programming of Viral DNA Duplication in HEp-2 Cells ..... 482

DISCUSSION AND PRELIMINARY REPORTS

Daniel L. Wulff and Karl Metzger. A Thymine Requiring Mutant of Phage T4 ..... 499
T. Fukushi and E. Shikata. Fine Structure of Rice Dwarf Virus ..... 500
T. Fukushi and E. Shikata. Localization of Rice Dwarf Virus in Its Insect Vector ..... 503
Bernard U. Bowman, Jr. and Robert A. Patnode. Infection of Protoplasis of *Escherichia coli* by Bacteriophage X174 Treated with Specific Antibody ..... 506
K. B. Easterbrook. Conservation of Vaccinial DNA During an Abortive Cycle of Multiplication ..... 508
S. Sarkar. Is the Potato Leafroll Virus Transmissible by Use of a Phenol Extract? ..... 510
Willima A. Strohl, Harriet C. Rouse, and R. Walter Schlesinger. *In Vitro* Cultivation of Malignant Cells Derived from Adenovirus-Induced Hamster Tumors ..... 513
C. H. Andrewes. Recommendations on Virus Nomenclature ..... 516
M. W. Johnson and G. T. Hills. Electron Microscopy of Turnip Yellow Mosaic Virus (TYMV) Ribonucleic Acid (RNA) ..... 517
Fritz Lehmann-Grube. A Sensitive Plaque Assay for Influenza Viruses ..... 520
Cellissa Norcross, J. F. McCrea, and Sigrid Angerer. Purification of Herpes Simplex Virus with Fluorocarbon and Potassium Tartrate Density Gradients ..... 522
Takaharu Hayashi and Chiaki Matsui. Electron Microscopy of Tobacco Mosaic Virus Particles in Necrotic Lesions ..... 525
N. O. Kuhn and C. G. Harford. Electron Microscopic Examination of Cytoplasmic Inclusion Bodies in Cells Infected with Parainfluenza Virus, Type 2 ..... 527
Clyde R. Goodheart, Jean E. Filbert, and Robert M. McAllister. Human Cytomegalovirus. Effects of 5-Fluorodeoxyuridine on Viral Synthesis and Cytopathology ..... 530
Erratum ..... 532

Number 4, December 1963

Mashiko Oda. Vaccinia Virus-HeLa Cell Interaction. II. The Effect of Mitomycin C on the Production of Infective Virus, Complement-Fixing Antigen, and Hemagglutinin ..... 533
B. Kassanis and G. W. Welkie. The Nature and Behavior of Unstable Variants of Tobacco Necrosis Virus ..... 540
A. H. Doermann and Linde Boehner. An Experimental Analysis of Bacteriophage T4 Heterozygotes. I. Mottled Plaques from Crosses Involving Six *r*11 Loci ..... 551
Myron Levine and Marcene Borthwick. The Action of Streptonigrin on Bacterial DNA Metabolism and on Induction of Phage Production in Lysogenic Bacteria ..... 568
Donald J Cummings. Anomalous Hydrodynamic Behavior of Bacteriophage T2 ..... 575
Doris Dahl and C. A. Knight. Some Nitrous Acid-Induced Mutants of Tomato Atypical Mosaic Virus ..... 580
A. Boeyé. Relations between the d Character and the Adsorbability of Poliovirus to DEAE-Cellulose ..... 587
H. P. Liu. The Nature of the Causal Agent of White Leaf Disease of Sugarcane ..... 593

A. M. Watrach, L. E. Hanson, and M. A. Watrach. The Structure of Infectious Laryngotracheitis Virus ..... 601
V. E. Gilbert. Enzyme Release from Tissue Cultures as an Indicator of Cellular Injury by Viruses ..... 609
Peter Hausen and Daniel W. Verwoerd. Studies on the Multiplication of a Member of the Columbia SK Group (Me Virus) in L Cells. III. Alteration of RNA and Protein Synthetic Patterns in Virus-Infected Cells ..... 617
Daniel W. Verwoerd and Peter Hausen. Studies on the Multiplication of a Member of the Columbia SK Group (Me Virus) in L Cells. IV. Role of "Early Proteins" in Virus Induced Metabolic Changes ..... 628
Harvard Reiter. The Location of the Inhibitory Action of KCN and Several Polyamines on Bacteriophage Replication ..... 636
M. C. Davies, Mary E. Englert, G. R. Sharpless, and V. J. Cabasso. The Electron Microscopy of Rabies Virus in Cultures of Chicken Embryo Tissues ..... 642
E. Heller. Enhancement of Chikungunya Virus Replication and Inhibition of Interferon Production by Antinomycin D ..... 652

DISCUSSION AND PRELIMINARY REPORTS

M. H. V. van Regenmortel. Serologically Related Plant Contaminants in Preparations of Partially Purified Plant Viruses ..... 657
Robert A. Weisberg. Virus Multiplication and Cell Killing in Polyoma Infected Mouse Embryo Cultures ..... 658
Antti Vaheri and Kari Cantell. The Effect of Heparin on Herpes Simplex Virus ..... 661
Rudolf Rott, A. P. Waterson, I. M. Reda. Characterization of "Soluble" Antigens Derived from Cells Infected with Sendai and Newcastle Disease Viruses ..... 663
Byron S. Berlin, James L. McQueen, Elva Minuse, and Fred M. Davenport. A Method for Increasing the Sensitivity of the Hemagglutination-Inhibition Test with Equine Influenza Virus ..... 665
Peter E. Lee and L. N. Chiykowski. Infectivity of Aster-Yellows Virus Preparations after Differential Centrifugations of Extracts from Viruliferous Leafhoppers ..... 667
Robert A. Weisberg. Delayed Appearance of Transformed Cells in Polyoma Virus-Infected Mouse Embryo Cultures ..... 669
Author Index ..... 672
Subject Index ..... 675